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COMPUTATION OF INTEREST

I. DEFINITION: Interest is expense or income resulting from the use of wealth over a period of time. It results in an increase of indebtedness or of investment according as the money or credit is borrowed or loaned. When interest is reckoned only on the original indebtedness, it is simple interest; when it is added to the principal and increases the indebtedness, it is compound interest.

II. COMPUTING SIMPLE INTEREST: In computing simple interest, take the rate of 6%, which is the common rate and a factor of 12, the number of months in a year, and of 30, the number of days in a month, and make adjustments for higher or lower rates. It is customary to consider 360 days in the year, but when desirable to take the exact number of 365 days, adjustments must be made for the difference. A rate of 6% per annum is equivalent to a rate of 1% for 2 months, or, expressed as a decimal, .01. Hence, the interest on any amount at 6% for 2 months can be secured by moving the decimal point two places to the left. Interest for 6 days can be secured by moving the decimal point three places to the left, because 6 is 1/10 of 60. According to this principle the interest on \$9,821.40 at 6% for

6 days is \$ 9.82
60 " " 98.21
600 " " 982.14
6,000 " " 9,821.40

If the number of days is such that it can be separated into parts each of which is a fraction or multiple of 6, the interest may be figured by totaling the interest computed for these parts.

Illustration: To find the interest on \$847.15 for 108 days:

\$ 8.472 interest for 60 days
4.236 " " 30 "
1.412 " " 10 "
.847 " " 6 "
.282 " " 2 "
<u>\$15.249</u> " " <u>108</u> "

When the principal is a factor or multiple of 6, interchange principal and days. The interest on \$4,800 for 27 days is the same as the interest on \$27 for 4,800 days. The interest on \$27 for 60 days equals \$0.27, secured by moving the decimal point two places to the left. Multiplying \$0.27 by 80 gives \$21.60 the interest on \$27 for 4,800 days, or its equivalent, the interest on \$4,800 for 27 days.

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Alternative Method - When neither of the above methods can be employed, the following rule may be applied:

1. Secure the interest for 6 days at 6% by pointing off 3 places in the principal.
2. Multiply this result by the number of days interest is reckoned, which gives interest for six times the required number of days.
3. Divide this result by 6.

Illustration - To find the interest on \$942.52 for 19 days at 6%:

$$\begin{array}{r} \$.94252 \text{ interest for 6 days} \\ \hline 19 \\ \hline 848268 \\ 94252 \\ \hline \$17.90788 \text{ interest for } 11\frac{1}{4} \text{ days} \end{array}$$

$$\$17.90788 \div 6 = \$2.98465 \text{ interest for 19 days}$$

When the rate is other than 6%, the interest should be found at 6% and the amount thus found adjusted to the required rate. Thus, interest on \$942.52 for 19 days at 3% is equal to $3/6$ of \$2.98465, the amount computed above, which gives \$1.4923.

When interest has been computed on the basis of 360 days as in preceding illustrations, and it is desired to adjust it to a 365-day basis, the amount of the interest should be decreased by $1/73$ of itself, because the difference of 5 days is $1/73$ of 365. Thus, to find the exact interest on \$942.52 for 19 days at 6%, take the amount computed on a 360-day basis shown above as \$2.98465, and from this amount deduct $1/73$ of itself, which leaves \$2.94377 as the interest for the given time and rate of a 365-day basis.

Explanation of reason why $1/73$ is subtracted from ordinary interest:

$$\begin{aligned} 1 \text{ day's int. on 360-day basis} &= 1/360 \text{ of year's int.} \\ " " " 365-day " " &= 1/365 " " " \\ 1 \text{ day's exact int.} &= 1 \text{ day's ordinary int.} = 1/365 : 1/360 \\ \text{or as } 1/73 : 1/72 &= 1/73 \text{ times } 72/1 = 72/73 \\ \text{or, exact int.} &= \text{Ordinary int.} = 72 : 73 \end{aligned}$$

III. INTEREST IN THE CASE OF PARTIAL PAYMENTS: When partial payments are made on a debt the United States Rule should be followed in calculating interest.

The United States Rule gives precedence to the interest due at time of each payment, and requires that each payment be applied first to liquidate interest then due. The remainder after deducting interest is applied to the reduction of the principal. If the payment is not sufficient to

III. (Cont.)

liquidate the interest then due, it is applied against it, but the unliquidated interest is not added to the principal, as it is in case of compound interest, but is carried forward and added to the interest which is deducted from the next payment.

Illustration - The following example illustrates the methods:

Jan. 1, original amount.....	\$6,000
Feb. 1, payment.....	2,000
Mar. 1, "	2,000
June 1, "	1,000

Interest is charged at the rate of 6%. Required to find the amount due July 1.

Solution according to United States Rule:

Original debt.....	\$6,000.00
Payment Feb. 1.....	\$2,000.00
<u>Deduct</u> interest on \$6,000 for 1 mo.....	<u>30.00</u>
	<u>1,970.00</u>
	<u>\$4,030.00</u>
Payment Mar. 1.....	\$2,000.00
<u>Deduct</u> interest on \$4,030 for 1 mo.....	<u>20.15</u>
	<u>1,979.85</u>
	<u>\$2,050.15</u>
Payment June 1.....	\$1,000.00
<u>Deduct</u> interest on \$2,050.15 for 3 mo.....	<u>30.75</u>
	<u>969.25</u>
	<u>\$1,080.90</u>
Interest on \$1,080.90 for 1 mo.....	<u>5.40</u>
Total due July 1.....	<u>\$1,086.30</u>

